TS Bulletin#1-92

An Amateur Publication
of
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Ottawa, Canada

"TS Info for You" is our motto. #1-92 Ottawa TS Support Unit

--Extra Issue--Photocopy Freely - ©March 31,1992 in the public domain -- 8 pages

Time to clear off the editor's desk is what brings this extra issue to you. I have too much material so this combines material that did not make 1991 and 1992 extras. As well next issue seems to require more work than planned and is proceeding slowly. Meanwhile time is flying and some topical issues about the hobby and the industry need some mention and comment which may stir up new thinking (as you read pages 3 & 5).

This is a good time to reveal that a lot of thinking about how to handle these newsletters has turned up some new directions to take. Publishing of booklets to go with the flow of orphan/classic and especially TS user growth towards students is being planned to cover the fundamentals of computers and theory they depend on, one topic in each booklet. A sample of the new booklet material is on page 8, on that most fundamental of topics to modern electronics, but one a bit neglected in enough textbooks, the topic of voltage regulators. In this article we leave all the stuffy mathematics behind and go for a gut feeling of intuition on the topic.

Work here beyond newsletters has also included the rewriting and expansion of the books on "Tips & Tricks of the User Group Masters for the ZX-81" and "The Unofficial ZX-81 LDOS Technical Manual". Since these are likely to have a limited market at about $30 and $40 repectively, they probably will be discontinued after revision plus a few months, at least as distributed from here. The books are usually provided unbound since binding them interferes with the usual customers' making photocopies off them, the usual customers being user groups. Binding by Cerlox will cost about $5-10 more and by stapling, $4 or so more, but both must be specially requested or the copies are sent out unbound. As mentioned, even replies to letters by those with whom the writer is not already corresponding need $2 to get them off in the mail, since costs are swamping me at a time when other works are starting to pull me away from these newsletters anyway. (I feel that if I at least publish that policy if someone prints something silly and I get a lot of mail looking for 'free' replies, etc., of a volume that I can not afford to answer, I could also tell them they had better publish a reply or something themselves. It did happen once, but luckily did not result in any volume I could not handle although the misunderstanding was incovenient enough at the time.) Two more answers to questions: Can you get any of my paper publications on disk? Ans. No. Disk and paper versions are kept separate so far and never the twain shall meet unless I buy a scanner some day. Similarly I do not put on paper anything that is on disk as it goes on disk since it is too much to publish on paper. I find it impossible also to retype anything on paper onto disk — the temptation to rewrite it and expand or abridge it is too much to resist and overcomes me every time!

Pet Project News — The eprom programmer is still sitting on the bench half-built and the spare ZX-81 to which it was to be connected has the ULA for its cassette interface blown although the main ZX-81 here is now one with a nice keyboard, 32K RAM and disk drive. The PDP-11 trainer/emulator is in disarray and the index editor with which I hope to create alphabetical index listings for my books needs more work although a comb sort has helped it now. So the ZX-81 is still used, although it is becoming more and more evident that machine code is its best niche.

CONTENTS:

-Will This Newsletter Survive? The Hobby Itself? Technicians?......p.3
- LDOS System- Cabling Tips Illustrated..............................p. 4
-Keep It Simple, Stupid - Quicker Text Data Compression-A Fix........p.6
- Programmers' Corner-Casual Comments on TS Database Design...........p.2
-The Best Of Times And The Worst of Times For Bargains...............p.5
-Voltage Regulators - A Simple Answer To The Whys of This Circuit...p.8
-Editorial and News From Here —Plus— Info On Our Other Publishing..p.1
- ZX-81 Cassette Problems-Technical..................................p.7

Notice- Back Issues not necessarily available any more. Work on possible retro-issues starting. First one includes most of the good and still interesting material from issues #1 and #2.!!!At $3, for a limited time only, a bargain.

WARNING: Do not buy, build, sell, send money, hack your hardware or software based on anything said in these publications without verifying absolutely via a second, technically qualified source. Advice of a technical nature is for non-commercial and educational purposes only by way of experiment in an appropriately supervised environment even if not otherwise stated clearly.

For further information, contact your local user group or nearest one. Address of of our contact person is on the envelope that this newsletter came in. Save it.

Programmers' Corner: Some Casual Comments-TS Database Data Compression

Perhaps you have seen a certain article in this series, that in the TS Bulletin News Supplement #s-8-90(or maybe not), but it did solve one problem the writer has had on a continuing basis, that of feeling that the writing may be going out into thin air, never to land on anyone's reading list. So for that question being answered no small amount of personal gratitude should be expressed on seeing the letter printed in one March-April'91 Sinc-Link, in which Steven Gunhouse has done more work on the problem mentioned in the original article, listing it in BASIC. Compressing data inside databases, in the case in point saving telephone numbers (normally requiring 7-bytes if simply ASCII or ZX-81 character code is used), to 3 bytes, was the game. Such solutions to the problem of getting more data than our little computers, call them orphans or classics, or more exactly more data than they would normally be expected to be able to hold will prolong their popularity by increasing their data capacity and the size of task and variety programs that they can use. Since data compression is such a useful feature to add to our little computers' programs, these newsletters have spent some time on it, certainly the TS Bulletin main (reduced size) issues having something on it, every issue.

(To clear up a mystery, one of these articles appeared to be "missing" when the Toronto User Gp. reprinted excerpts of some of my newsletters and not the whole thing, omitting pages of two of my newsletters, i.e. only three rather than all seven pages of #s-7-90 & #s-8-90 (5pp.) being copied and mailed. It was not a mistake!)

Thinking started while attending a meeting in the basement of a member of the now-defunct Ottawa-Hull Timex-Sinclair User Group, and looking at the model plane magazines and the TS2068 with Spectrum ROM and a disk interface brought back by its owner from Britain. Talk started up on the database and how his model plane reference materials had been entered into a database on the TS2068. The owner mentioned how many items were in the database, and after doing some arithmetic in my head, it seemed that that number of items couldn't possibly fit in the TS2068 memory, but they did! That started a chain of thought on how data within a database might be compressed and perhaps needs to be, for serious databases on computers with small memory. It led to a series of writings including the article in TS Bulletin News Suppl. #s-8-90. One of the pages 'missing' (from the Toronto Gp. mailing, but not from my own direct mailing of the limited numbers sent out as an extra to many user groups, not all) had an article on "The Joy of Small Computers", which discussed some of the basic concepts of computing. In it was some discussion of sorting routines, mentioning that you sometimes need to write a custom sort routine, as was found on trying to put my vacuum tube collection into Vu-File and get them out in proper order. Also as an afterthought, came the following, "...any attempt to compress data in your databases, (a wise thing to do), may require special sorting routines if the field to be compressed needs to be used as a key for sorting on."

A previous newsletter article of TS Bulletin discussed a way of getting char. info compressed, from the 8-bits per capital letter of ZX-81 code (or ASCII, which unfortunately has a lower case letter problem too), to 5 bits, and so getting 4 bytes, that is 4 characters, into 3 bytes that could be stored in a string or string array, in the ZX-81. Other places have discussion of compression by using enumerations, such as putting of the say, 128 choices in a byte (leave one bit free to avoid character codes that would cause the computer to crash if stored in a BASIC arrray), so that 6 choices by 20 (which makes 120, which fits in 128 of 7-bits), could be used, say the 6 as, 1-Mr., 2-Ms., 3-Miss, 4-Mrs., 5-Dr., 6-no title) and the 20 choices split further between 10, say for, 1-issue 1 sent, 2-issues=2, for up to 9 issues per year of newsletter, with 10 for no. issues sent this year, and the remaining choices, 1-long distance tel. no., 0-for local.

The article that time got into telephone number compression, as writing the "Joy of Small Computers" article of the same newsletter put it in mind, and since it is a deceptively tricky subject to deal with. The article consisted of a sort of dialogue of the kind that one starts with when brainstorming such an issue, and it seemed good fun to portray the kind of thinking and experimentation one would go through in starting to tackle such a programming task. (See also p.6, article.)

Without digressing much let's point out that the most dramatic way of getting big databases to work on a small computer is to use a disk drive (chapter 5 of the writer's book on the ZX-81 LDOS disk system, one no longer available from Larken, deals with this but at a $40 cost per book, probably only the 21 or so pages of that chapter would be affordable to copy and send out to readers of this at 25¢ per page or more). However, it is nice that the telephone number problem is getting some attention. It got me designing a system to save tel.nos. in one extra byte added to our membership database!

Will This Newsletter Survive? Will Our Hobby Survive? Technicians?

The title above asks three questions and their probable answers are not likely, maybe and even the question of the occupation of electronics technician surviving, in fewer numbers perhaps. Let's not give up easily though. What can we do? In a couple of previous articles, the topic of what the future of our computer hobby might be, revolved around what it might be transformed into. Possible answers were offered: a niche for a very small number of user group members, diminishing in time, to none perhaps, the formation of an overall group or several for 'classic' or orphaned computers as the media called them a year or two ago, a series of groups in which all the growth would be in high school or technical college user groups, or a non-group activity practised independently the way young boys used to build crystal radio sets for scout projects in the 1950's after adults stopped building radio sets for the most part after about the mid-1930's. The least likely alternative offered was to turn the user groups into 'classic car', museum, or historical society-like groups, perhaps operating out of local museums, or like amateur watch repair or other antiquarian clubs, like pipe organ restorers, and steam railroad buffs. All interesting possibilities, all speculations, all hopes more than practical plans for saving the hobby now that the novelty no longer draws many.

To be more practical, let's look for current membership categories showing growth possibilities: the unemployed, the retired and the youngster, a student filling that description or through teenage into adult students even. The retired are a special case, often having been old members rather than new members, just freed by retirement to take a more active possition of service to the hobby in existing user groups that they may have belonged to for some time. Unemployed and students, share an interest in education, weighted towards the beginner's basics but not excluding some rather sophisticated levels of existing knowledge, in both classes, as among the young will be future geniuses, and among the unemployed, those with work or education level that yields a desire to see topics like 'monolithic monitors vs kernels', and schematics versus simplified talk of 'electrons are like drops of water flowing through a strange maze of pipes'. So the future newsletter should have more coverage of the basics, the ideas that make using a hobby computer more than a zap, zap, bang sort of game, in fact, make it a crosswork puzzle, a $64 question, "Do you know why computer logic is called Boolean sometimes?", sort of game and an open ended test of ingenuity with the implied warning at the bottom of every schematic, "Do you know why this will not work when you build it?" (the answer being everything from a mistake in the drawing to your assumption that you are too smart to put a cold solder joint into your workmanship). Considering this, what now is our answer to the question of whether this newsletter will survive? Only if it is transformed into some sort of broader appeal newsletter of more explicit educational content and intent can this newsletter survive. Otherwise it will be ended on whim.

Trying to broaden the appeal of our user groups by admitting all makes, or many, might seem to increase the numbers, but weaken the motivation to stay with out favourite make of computer and to support it within a larger spectrum of compter makes and models. Some rule must apply to clubs that try mixed-make support, like that that governs the dying out of rarer family names in preference to the commoner. And that rule seems to be that a mixed-make club usually ends up only well-supporting the IBM PC. I beg to be proven wrong, but that seems to be the unsettling but clear trend. Why IBM PC support means boring and large but uncommitted memberships, seems to result from many trends, teaching the IBM PC in schools seems one, and I have often thought that schools should teach kids comic books and forbid Shakespeare and Chaucer .... The other is the old definition about the difference between work and hobby depending not at all on the type of activity but on not having to do it. Also running it needs many, many volunteers, to run it since the secret of keeping volunteers in volunteer work seems to be that a little goes a long way, and 40 hr. volunteer jobs lead to 96% volunteer turnover rates in 3 months or less. Also, if everyone is using an IBM PC at work, or nearly everyone, how can you make that into a hobby? At best it becomes an unpressured educational activity, and indeed IBM PC user group meetings are starting to look more like adult education classes, if sometimes massive, than gatherings of electronics or programming nuts. That isn't bad; it's just that it makes such groups something that is not likely to fill any old-time user group or 'hacker'-enthusiast members with renewed glee. It's sort of like seeing your old computer discount store replaced by a outlet for discounting women's shoes or something. The sad thing is that this is not trivial but a national waste in the making. (Continued bot., p.6)

LDOS DISK System CABLING Hints

(*NOTE: NOT LKDOS)

In order to help in the cable connection of the ZX-81/TS1000 LDOS disk interface, a few illustrations may help the text do its job. Remember: when in doubt, always recheck the specs!

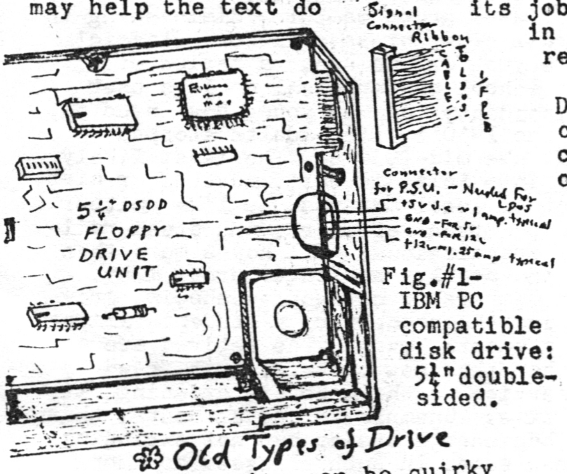
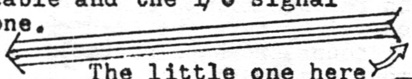

Signal Connector Ribbon
To CABLE
I/F PCB
Connector for P.S.U. - Needed For LDOS
+5v d.c ~1 amp. typical
GND - For 5v
GND - For 12v
+12v ~1.25 amp typical
5¼" DSDD FLOPPY DRIVE UNIT

Fig.#1- IBM PC compatible disk drive: 5¼" double-sided.

✿ *Old Types of Drive* mechanical units can be quirky and may require tricks to make them work with LDOS, if at all.

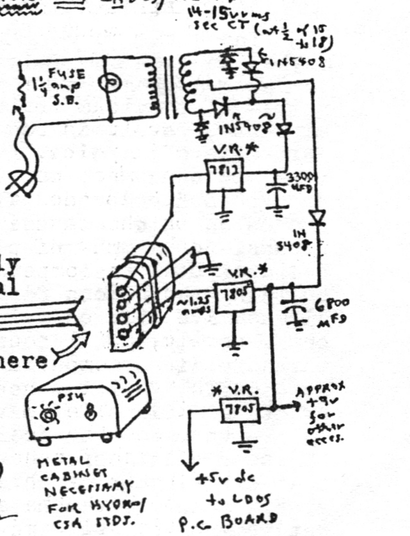
Disk drives have two cables, the power supply cable and the i/o signal one.



The little one here is the power one. The LDOS separate power supply powers the disk drive and the LDOS board too. (See Fig.#2 for design sketch.)

- Be A Pro -
Follow ALL SAFETY Rules

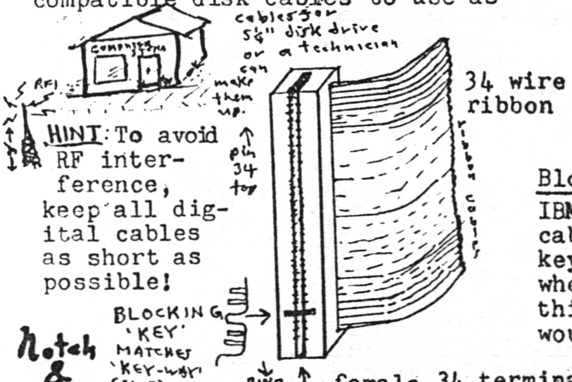
A technically qualified person should set up the system and do all cabling. However every user should know how it should look. If there is a problem, consult your Larken dealer or local user group experts.


2½ amp
14-15v rms sec CT (or ½ of 15 to 18)
FUSE 1¼ amp S.B.
1N5408
1N5408
V.R.*
7812
3300 MFD
1N 5408
V.R.*
7805
~1.25 amps
6800 MFD
PSU
METAL CABINET NECESSARY FOR HYDRO/CSA STDS.
*V.R.
7805
APPROX +9v for other accs.
+5v dc to LDOS P.C. BOARD

IMP. *ALL V.R. I.C.'S VERY HEAVILY HEAT SUNK

Fig.#2- a Typical outline for a LDOS psu design (NOT TO BE USED- specimen only)

You Can Buy standard IBM PC 5¼" compatible disk cables to use as cables for 5¼" disk drive or a technician can make them up.


COMPUTER STORE
RFI
34 wire ribbon
ribbon cable
pin 34 top
PIN 2 top
BLOCKING 'KEY' MATCHES 'KEY-WAY' (SLOT) IN EDGE OF P.C.B.
Notch & Key

HINT: To avoid RF interference, keep all digital cables as short as possible!

↑ female 34 terminal edge connector between disk drive and LDOS pcb

Fig.#3-Signal (I/O) cable, Ribbon cable with connector (A standard IBM PC compatible one can be used, although Larken supplied cable may not have a key and the LDOS pcboard no keyway.)

Blocking key- standard IBM PC floppy disk cables use a blocking key (plastic chip) where otherwise a third-from-end terminal would be. Since Larken El. sold its own cables for the system, they often did not use this key not cut a keyway for it on the LDOS disk i/f pcboard. This must be done carefully-hacksaw and fine file.

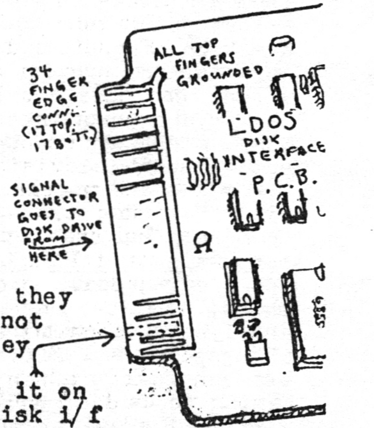
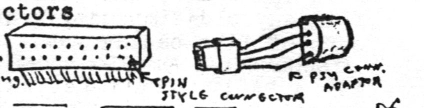

34 FINGER EDGE CONN. (17 TOP, 17 BOTT.)
ALL TOP FINGERS GROUNDED
SIGNAL CONNECTOR GOES TO DISK DRIVE FROM HERE
LDOS DISK INTERFACE P.C.B.

Fig.#4-LDOS disk interface pc board may need a keyway cut if not there.

PIN CONNECTORS -instead of edge connectors some of the newer disk drives, certainly the new 3½ inch ones, have new connectors, smaller psu ones and pin connectors for the ribbon cable. Adaptors can be had.

Fig.#5-3½ inch drives use smaller connectors or adaptors in addition to other problems arising.


PIN STYLE CONNECTOR
PSU CONN. ADAPTOR

from: UNOFFICIAL ZX-81/TS1000 LARKEN EL. DISK INTERFACE SYSTEM GUIDE by B.J.H., OTTAWA, ONT.

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Shopping in A Recession: The Best of Times And The Worst Of Times For Bargains

As a computer hobbyist and electronics hobbyist things never looked better, right? Even military surplus test equipment is turning up on the surplus market for the first time since the 1960's, a case of the peace dividend. IBM PC compatibles are at an all-time low in price. Just as labour costs in Japan go the route of those in Europe, putting their products up in price, new suppliers are coming onto the market from other, lower wage countries, so we shall always have cheap, quality things from abroad, won't we? As one falls away, another will replace it. Well, even if that might be the case in the distant future, at the moment it seems, the market has such a mix of products, that one cannot claim that all of Japan's (or Hong Kong's) competitors can replace the quality in goods that we have come to expect along with the reduced prices.

A little example. Recently I purchased a couple of Chinese (People's Republic, still socialist-communist, or whatever) pocket radios. The battery door seemed to want to fall off one, and the whole radio come apart, something that I noticed in the other too, the battery holder not fitting in easily. The fm radio was a sort of bulky model with the style of a walkie-talkie, and the reception quality on the local station I listen to poor, full of high frequency hiss and drifting off the station easily. But the most surprising thing was I found another pocket radio in a drawer, that seemed to have the same design electronically, yet was slim, the battery holder fit well and seemed sturdier, and the reception on fm was a lot better. Poking around inside I found it seemed to use even the same transistor numbers, and had "UK Design" written inside it, being made in Hong Kong, a British colony. Virtually the same design and components, one not very attractive on the open market, poorer in every way, and the other, made in soon to be absorbed into the Chinese Republic, Hong Kong, well made and nicer looking, even though imported almost one decade ago. That is something to remember if the former Communist factories in Europe start trying to sell, say VCR's or something over here in the near future, or selling them to tourists looking for a bargain when visiting Europe from here. Some things are easier to make abroad than others, in new factories or poorly run ones, no one now being able to beat say Kodak, for color print film yet, and some of the tries if cheap, rather pathetic. Batteries would seem much simpler to copy the technology of, but no one is rushing to buy Brazilian or Indonesian batteries here, although they have both been sold here. With things like batteries where distance is a problem, the long trip in a hot steamer may not get them here (in the 3 or 4 months it might take) in prime condition either.

So we have the time it takes for a foreign manufacturer to get up to speed on the the technology as well as for the distributers to find who can make a good product and eliminate those who can't. A few years ago, for example, televisions with faulty fly-back transformers were sold here, the foreign component substituted for the American-made component having a high premature failure factor. Now, apparently a similar problem has turned up with some (colour) computer monitors. Other than the CRT, the flyback transformer is usually the most expensive single part, and if they are all made by the same supplier, one whose reliability has not been fully assured, getting one replaced under warranty, may mean replacing it with a similarly faulty one which may barely get the owner past the warranty period. So when there is such desperate competition everything from cars to electronics may have components often expensive to replace, in them that come from untried suppliers and factories without a know quality or technology record. That will mean a risk for the consumer, even in buying familiar domestic makes, if they have started to use such untried, foreign components in the model you spent your hard-earned money to buy. A familiar brand name is no longer the guaranty of quality it used to be in other words, but a new name, may be a better bargain, but with no track record to judge it on, also a high risk.

For those buying a computer two more risks exist. One is paying a higher price for a computer used, than a comparable one new is one, in this time a rapid discounting. Used computers too vary in price strangely, according to the price the seller originally paid not the current market price used that most sell at. The second risk is buying a new or used computer for which you can't get any new software or even repairs. So it's still buyer beware, bargains or not out there. ~ *TS Bulletin Hobby N-L* ~

Keep It Simple, Stupid - Quicker Text Data Compression - A Fix

Previous articles have suggested that the simplest and most efficient forms of data compression would handle the points that offered the most gain for the least pain, if you have to write a routine for an orphan computer or a package of software little used. A great saving may come simply from using TAB's in a word processor text instead of saving a bunch of blank spaces to the left of a centered line of text like a heading. The most frequent letters to tackle would be space which occurs at the end of each word and takes up 16% of the space in a text file that way. The second character to handle would be 'e'. In addition, using one bit in ASCII to distinguish between the occasional capital letter in a text that is mainly lower case, could be better spent in coding the space at the end of words which is a much more frequent occurrence, so that a special character preceding a letter which is to be capitalized could relieve that extra bit in ASCII of its less frequently used capital/lower case distinguishing job. And RLE encoding is a quick fix for compressing nearly all files of text especially if TAB is not used. That is our game plan up to date. However, the scanning of text using BASIC to find these spots is the tedious part of such a compression method and begs for use of speed-up strategies. Simplest for m/c programmers would be a machine code pre-processor that will in one pass, by use of some sort of map, flag the secondary ways to save memory and precisely where to apply them in text while at the same time flipping bits to (set msbit to 1 where a space precedes the character) and a second pass to get rid of the now unnecessary space characters (ASCII 32).

After that a BASIC routine could look at the map the m/c produced and decide the best places, if any to make the further compressions, RLE and 'e' for example, using BASIC routines that would run more slowly but be easier to write. A program like data compression that you never use since it is too slow, is hardly any good.

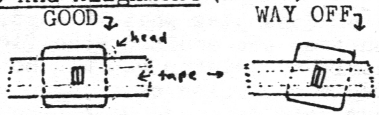
Survival? (Continued from page 3) --------- It is hard to keep the enthusiasm for technical and scientific learning going if enthusiasts don't meet. Who sees a goal?

People aren't stupid, kids less so in that they have no axe to grind, no vested interest in not seeing that times have changed. And they have. And the change is not good for anyone hoping that our nation shall continue to attract bright people to the technological professions or vocations. Ironically it is less hassle to train an engineer in electronics than a well-rounded technician in the same field, the things a technician having to learn, taking a lifetime of patient sufferance in the home, school and employment, (like not laying off those who are slow to learn or have less than 5-10 years of 'apprenticeship' behind them in the case of jobs, — like compulsory technical education for all in elementary-junior high schools, to simply get those skills in place that an electronics education must have to build on later). A professional in the technological work field simply would say that that is irrelevant, that technicians are being designed out of the product cycle by such things as throw-away modules or whole tv sets, and the the training remaining to be done is so narrow in focus that anyone can be taught it in 6 weeks or less. The first argument against this shows that it is not the way it happens out in the field, contrary to those engineers with only factory experience. Take the story about British technicians fixing their sophisticated radar with pieces of wire out of the officers' toaster in the Falklands Battles. It says that some things do need to be fixed out there, and not without difficulty and improvisation that takes a breadth of knowledge. So, the technicianless technology trend may, considering increased reliance on electronic innards of everything, slow instead of increase demand for repair technicians as some devices cease to warrant repair.

The second response is the one crucial to user groups, that enthusiasm in the young for technology is waning. It is boring. It is hard, and the glamour is totally lacking, gone with the big money, job satisfaction and decent way of life. Unfortunately, transmitting what remains of that enthusiasm was one of the last great contributions to society of the enthusiasts' form of hobby computer user group, and it is gone forever, of fast going, as a mass activity with a mass effect. Hardware hackers and software programmers, the two categories hardest to recruit in current high tech, (to which we could add the general science enthusiast, especially applied science, that other name for technology), no longer are being groomed and tinker-titillated while young by these groups of nuts and bolts level enthusiasts, as they were in the past. (How many in the field owed much to using a ZX-81? Many!) Where will the ideas come for future innovations, if not with these kids, twenty years later? Not from the executive suites of Tokyo or Detroit! ~~264~~

Technical Fixes: Cassette Problems And Alignment (ZX-81)

What is head azimuth? Ans.:
Illustr.#1



Many loading problems particularly with commercial software can be solved by adjusting the cassette azimuth. However once the azimuth is changed, you probably will never be able to get it back to its original position. Azimuth simply means the angle from the vertical of the recorder head. There are two types of adjustment; to optimize the adjustment for most ZX-81/TS1000 recording and playback or to optimize to bring the azimuth closest to that of the machine that recorded the hard-to-load tape (that machine may have been way off). If your machine works well for most tapes it would be wise to leave it like that and adjust the azimuth on an older machine if you are trying to load a single baulky tape. Many ZX-81/TS1000 users have two cassette recorders one for which the azimuth has never been or had to be adjusted (the good machine) and another to adjust the azimuth for the odd hard-to-load tape. Once you have adjusted the azimuth you may have to reajust it on almost every load after that!

The easiest adjustment to explain is the adjustment of azimuth to match a hard-to-load tape. Put the tape in question in the machine. Play it into the computer. Now, adjust the azimuth screw while it is running until you get, after a number of trials, proper tape loading. The screw is usually located through a hole in the cassette recorder body near the record head (you may have to have the cassette door up) and is reached with a jeweler's screwdriver (when the machine is playing only). You should not turn it more than one-half-turn either way. This will not adjust azimuth to mfg. specs!

To try to adjust the azimuth to optimum setting for general recording if it is maladjusted, adjust while you play a computer tape until you hear the most treble and hiss to get a rough start on the correct setting.

If you are really into electronics the proper way to do it is to put a multimeter set on output or volts across the speaker (or across a 24-50 ohm dummy load at the external speaker or ear jack with an extra earphone plug) and adjust the azimuth for the maximum meter deflection (most volts or db). *①

There are also various tricks and accessories. An audio output transformer may be used*② between the cassette on play and the computer with the 8 ohm side to the ext. speaker and the high-Z side to the computer (Radio Shack Part No. 273-1380, the 8 ohm side has 2 leads the other three). This has been recommended for use with the TS2068 in baulky loading or uploading of ZX-81 programs. (②*It can overload the ZX-81 ULA chip or recorder ruining it.)

Russell Electronics sells a Winky Board which helps condition the interface signal and helps you find the optimum volume control level with a minimum of adjustment. **(Russell El., RD 1, Box 539, Center Hall, PA, USA 16828.)**

Some people say a longer cord should be used. Some say transient suppressors help. Some add certain filters to the line of a homebrew type.

In fast load mode there is one commercial cassette fast load which comes with a special piece of hardware which it requires. A Turnbull fast load Z-80 m/c program (double regular ZX-81/TS1000 speed) is very touchy about recorder condition, azimuth and volume control levels. *③

Loading with the TS2068 often will not be successful in difficult cases when the computer has been on for a while and is hot. The solution is to turn it off for an hour or two and try again when it is cold. Also the TS2068 cassette system seems prone to problems with glitches, brown-out (power voltage drop) and too many accessories mounted on it power supply bus. This is particularly a problem with the cantankerous ZX-81/TS1000 upload programs which load ZX-81/TS1000 tapes at the regular speed to convert the programs to TS2068 BASIC. (Note: the TS2068 is a completely different model.)

I hope that this collection of home-cures will help you. If you have heard of any others that work, the writer would be interested in hearing.

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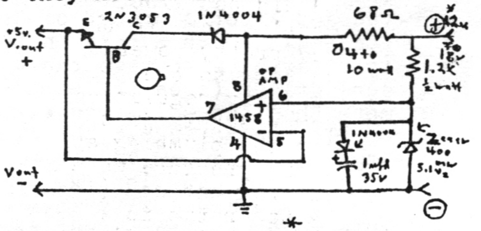
*③ Mr. Bill Turnbull, a former Ottawa-Hull TSUG member kindly turned over copies of this program, after giving a demonstration of it, to the OHTSUG software library. The TS2068 uses a faster and more reliable method.

*① Proper alignment should also use a special test tape sold by some suppliers to the electronic industry.

Voltage Regulators - Why Do Computers Need Them?

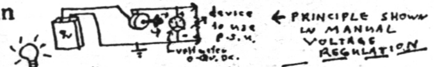
A voltage regulator does just what it says, it tries to keep the voltage from going up or down from the desired specified level. If you look inside an old radio, tube or early transistor you are not going to find a voltage regulator but if you look inside a colour tv or a computer you almost certainly will. The two things that colour televisions and computers have in common is being modern and having certain internal circuits varying very greatly, moment to moment in how much current they draw from the power supply. A power supply has a certain internal resistance, since it is not perfect, and like a plumbing pipe can only deliver so much water pushed so hard, before the resistance of having it made to a given size starts to slow it down. In many buildings that means that flushing a toilet can cause your shower to run short of pressure, since too many things are drawing water at the same time for everyone to get the pressure they need. With electronic circuits needing more current one minute than the next, the power supply will run out of push, (voltage run down), in much the same way that the shower starts to lose its pressure. Unfortunately for a computer, this means that the logic circuits get the ones in binary that can say true, mixed up with the zeros in binary that can mean false, and there goes the carefully designed logic plan in your program. No logic can work when the distinction between trues and falses start to get mixed up at random.

Why didn't old radios need voltage regulators? Largely because it was easy enough to design a big enough power supply for them since they used not too much power and did not fluctuate wildly in the current they needed to draw from it at any one instant to the next. Computers would need pretty powerful power supplies and expensive too, so the problem was tackled another way, by regulating the voltage at the power supply just like turning a big tap in the plumbing system on harder to make more pressure when many things are trying to draw water. (Experiment, half close the water tap in a house at the main basement entry point and then turn on a tap and flush the toilet and watch how much more the tap water dwindles than when the main tap was wide open. Open tap and repeat.)

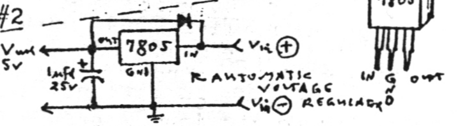


Drawing #1- Experiment With Voltage Regulation Circuitry

A voltage regulator circuit can be made as a demonstration that works much the same way, to be like the tap; at the main power supply exit for the current, it in effect turns the tap open wider or narrower. You could use a volume control and do it yourself if you were supernaturally fast at turning it -Drawing#2. Using a transistor to act as the variable resistance and an amplifier to drive it, is the way the voltage regulators found in for example a Sinclair ZX-81 work, that is, mainly the 7805 voltage regulator inside the keyboard unit. It also has overload protection, which the circuit in drawing #1 does not have, and for that reason, it is not good for use in any serious application other than a little lab experiment. But you can build our little circuit* and test it by attaching one or two 9 volt batteries in series to its input, and measuring the voltage output. (After adding one or more extra batteries the some parts could get hot! Be careful.) Drawing #3, shows a 7805, that has all the voltage regulation qualities of drawing #1 plus more and extra current capacity and safety features that would be too complicated to add to the other circuit.



Drawing#2



Drawing#3 - 7805, 5 volt voltage reg.

The voltage regulator is one of the marvels of modern electronics, saving great expense in overdesigning power supplies, the method that would have to be used if they had not been invented. And why do colour TV's need them? What is it that draws a lot of current one minute and much less the next? Well, if the picture tube were a light bulb you would expect it to need more current to light up for a bright scene than for a darker one, with big dark areas in the picture. So a picture tube is not different enough from a light bulb that it doesn't do that too. Many things including computers depend today on voltage regulators.